

# *Modern Concepts of Cardiovascular Disease*

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## **THE COURSE AND OUTCOME OF CASES OF SUBACUTE BACTERIAL ENDOCARDITIS**

The studies of subacute bacterial endocarditis that have been made during the past twenty-five years have thrown much new light on the course and prognosis of the disease. For a long time it was practically a universal belief that the disease was always fatal. Occasional reports of recoveries were widely doubted. Now we have records of definite recoveries in the type of the disease usually encountered. We also have learned that there exist mild cases which have a very good prognosis and, furthermore, that patients may lose the infection and go over into what is termed the bacteria-free stage. The terms "recovery" and "bacteria-free stage" are arbitrary ones. The former applies to cases in which the infection has disappeared and also all the clinical phenomena except for a valvular defect that may have been present. The term "bacteria-free stage" applies to cases in which the patient has lost the infection but suffers from sequelae. At the post-mortem examination of such cases the lesions on the valves are found in either the healing or healed condition.

It simplifies the consideration of the subject to classify the cases into the following groups:

Group A. Cases of the usual type.

- B. Cases in the bacteria-free stage.
- C. Transitional cases.
- D. Mild cases.
- E. Recurrent cases.

Group A. Cases of the usual type. In the form of the disease that has usually been recognized, running a course of from 4 to 18 months or more, and characterized by marked elevations of temperature, positive blood cultures and embolic phenomena, there are but few recoveries. In my own first 150 cases, there were 4 complete recoveries or 3 per cent. Altogether I have witnessed 17 recoveries. Of these 17 cases, at least 7 are still alive. Four of those still living suffered only mild attacks. Two others had recurrences and are still alive, the period in one being 16, and the other 11 years.

Occasionally a patient loses the bacteria and the febrile reaction and goes over into the bacteria-free stage, having the same clinical picture as the cases to be described in the next group.

Group B. Cases in the bacteria-free stage. There is available an abundance of proof that patients

may suffer from an attack of subacute bacterial endocarditis, give no or insufficient evidence of the disease and come under observation with phenomena that must be considered as sequelae. One must suspect that in such instances the infection is short in duration or mild in character or both.

By the term "bacteria-free" it is not simply meant the absence of bacteria from the blood, because it is well known that there are occasional cases of bacterial endocarditis in which the blood cultures are completely negative and still the patient is in the active stage. For a case to be considered in the bacteria-free stage, the vegetations must also be proved to be free from bacteria, by means of stained spreads and sections. In any postmortem examination a few bacteria may be found in a careful search of vegetations by means of spreads or sections. If a case of subacute bacterial endocarditis is still in the active stage, the surface is covered by masses of colonies of bacteria. Special stress is laid upon the examination of stained spreads and sections because in a case in which the vegetations are bacteria-free the blood cultures may be positive, the infection being in the nature of a secondary invasion. Under such conditions the bacteria are generally found only in the flasks and not in plates of the culture medium, the invasion being a very sparse one.

The bacteria-free stage is essentially afebrile in character and the patients do not appear toxic. Fever may occur when marked anemia develops (anemic fever), or in the presence of breaking down of large infarcts (spleen), or intercurrent febrile conditions. In patients in this stage of the disease, besides occasional petechiae, Osler nodes, tenderness of the lower sternum, and some other symptoms of the active stage, we find in various combinations phenomena that give rise to a remarkable clinical picture and on the basis of such phenomena a clinical diagnosis can be made. These striking features are: A characteristic dark brown facial pigmentation, renal insufficiency due to subacute or chronic glomerular nephritis, progressive anemia, splenomegaly and embolic accidents (including embolic aneurysms). A valvular defect is nearly always present.

The most important causes of death are myocardial insufficiency, renal insufficiency, embolism (es-

pically cerebral), anemia, and pneumonia. Myocardial insufficiency plays much more of a role in the bacteria-free, than in the active stage. The significance of renal insufficiency in the bacteria-free stage is striking. In the active stage of the disease, diffuse glomerular nephritis is unusual, whereas in the bacteria-free cases, subacute or chronic glomerular nephritis is present in one-third of the cases in which the endocardial lesion is found healed.

There are on record three instances of recurrence of infection in the bacteria-free stage. In two, the patients died as a result of such attacks. In the third, the patient had two attacks of infection with positive blood cultures (non-hemolytic streptococcus), both being of mild character. The patient not only recovered from both attacks but also lost the anemia and marked enlargement of the spleen which had characterized the bacteria-free stage.

**Group C. Transitional cases.** This group is arranged merely for clinical features, including as it does, cases which essentially belong in Groups A and B.

The patients come under observation with varying clinical pictures.

1. They appear with symptoms of the active stage of the disease, and with positive blood cultures. The cultures soon become negative and the patients recover completely or present the clinical picture of the bacteria-free stage.

2. The symptoms of the active stage are present but the blood culture is negative. The outcome of these cases is like that in sub group 1. They simply come under observation at a time still closer to the afebrile period.

3. The clinical features are essentially those of the bacteria-free stage, but other manifestations, as for example, an abundance of petechiae in the conjunctival mucous membrane and the general appearance of the patient, lead one to conclude that the patient was very recently in the active stage of the disease. In one case of this kind, this impression was strengthened by the extraordinary observation made by the patient himself, that his fingers had become progressively more clubbed for several months, but that for a short time before coming under observation the clubbing had diminished. As the patient was a tailor, and judged by the size thimbles he could wear, the statement was readily credited. The postmortem examination revealed some lesions that were bacterial but many more that were entirely bacteria-free.

**Group D. Mild cases.** Sporadic mild cases of subacute bacterial endocarditis have been described and also two small epidemics. These mild cases seem to have been largely overlooked. In them the rectal temperature may not rise above 99.6°F. for weeks at a time. It may reach 101°F. and rarely 102°F. The patients are often up and about and may perform the duties of their occupation and even take part in social activities. Marked embolic features are not likely to be encountered. The existing anemia may be marked but is usually not so. When marked it is of value in making the diagnosis, as are also splenic enlargement and the presence of white-centered petechiae. Occasionally the presence

of Osler nodes or macrophages (in the blood obtained from puncture of an ear) are helpful in making the diagnosis. In some of these cases there is real difficulty encountered in differentiating them from some other conditions, such as tuberculosis, anemias, so-called neurasthenia, etc. The diagnosis is more apt to be overlooked if a definite valvular defect is not present.

It is difficult to give a correct estimate of the duration of any of the cases of subacute bacterial endocarditis, and particularly so of mild cases. While the latter appear to be usually of short duration (occasionally as short apparently as three weeks), they may last for quite a long time. Cases have occurred lasting six months and also one year. The most remarkable case on record is one of a man who was sick from September, 1922 to September, 1925. Except for a few short periods during which he suffered from pulmonary complications, the rectal temperature for weeks at a time did not rise above 99.4°F. Positive blood cultures (non-hemolytic streptococci) were obtained for a period dating from November, 1923 to June, 1925. On one occasion 200 colonies of streptococci to the c.c. of blood were found when the temperature was 99.2°F. by rectum. Three years after the time of recovery, the aortic insufficiency murmur disappeared.

Practically all the reported mild cases ended in recovery. One such case died suddenly three years after recovery. He had suffered from mitral stenosis and developed, early in the course of his infection, a very marked enlargement of the liver and sinoauricular standstill (embolism of right coronary artery?).

**Group E. Recurrent Cases.** Our knowledge of recurrences dates back only about eleven years. It is probable that many recurrences are clinically overlooked. Pathological studies surely point definitely to this conclusion.

Even in the small number of mild cases that have been described, the course has been so variable that it would be profitable to mention them all.

1. The patient suffered an attack of infection and another six months later, and has had no further trouble for sixteen years.

2. The patient had two attacks with an interval of nine months and has been well for twelve years.

3. Sixteen months after recovery from an attack, a second fatal attack took place.

4. The patient came under observation in the bacteria-free stage and died with an attack of infection which came on two months later.

5. The patient died of an attack that came on sixteen months after he had first come under observation in the bacteria-free stage.

6. This patient, already referred to in discussing the bacteria-free stage of the disease, came under observation in the bacteria-free stage, had two mild recurrences, lost the evidence of the bacteria-free stage and has been well now for a period of at least seven years.

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